Remarks

The invention relates to devices for conducting assays, including qualitative, semi-quantitative and quantitative determinations of a plurality of analytes in a single test format. In Paper No. 18, the Examiner has reopened prosecution of the instant application following submission of an Appeal Brief by Applicant. Applicant respectfully requests reconsideration of the claimed invention in view of the foregoing amendments and the following remarks.

Prior to the present submission, claims 74-100 were pending in the application. The Examiner has indicated that claim 76 would be allowable if written in independent form. In response, Applicant has cancelled claim 76, added new claim 101, which contains the subject matter of claim 76 in independent claim form, and added new claims 102-113, which are identical to previous claims 77-88, but written to depend from new independent claim 101.

Applicant has also amended claims 78 and 95 herein. These amendments do not alter the scope of the claims, but rather are intended for the benefit of the Examiner in understanding the instantly claimed invention. Notwithstanding the foregoing, Applicant expressly reserves the right to pursue subject matter no longer claimed in the instant application in one or more applications that may claim priority hereto.

Art-Based Remarks

35 U.S.C. § 112, first paragraph

Applicant respectfully traverses the rejection of claims 75, 90, and 96, as allegedly failing to satisfy the enablement requirement of 35 U.S.C. § 112, first paragraph, with regard to the phrase "at least 50 discrete capture zones."

The standard for determining enablement is whether the specification as filed provides sufficient information as to permit one skilled in the art to make and use the claimed invention. *United States v. Telectronics, Inc.*, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988). The test of enablement is not whether experimentation is necessary, but rather whether any experimentation that is necessary is undue. *Id.* A considerable amount of experimentation is

permitted, provided that it is merely routine, or provided that the specification provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed. *In re Wands*, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

Applicant respectfully submits that the Examiner's objection to this phrase in Paper No. 18, page 2 ("[t]here does not appear to be any teaching of the claimed 'at least 50 said discrete capture zones'") appears to be an objection under the written description requirement of 35 U.S.C. § 112, and not the enablement requirement. Nevertheless, Applicant submits that the instant specification provides a description of devices comprising at least 50 capture zones.

As acknowledged by the Examiner, the specification describes devices comprising "one or more capture zones." Paper No. 18, page 2. Figs. 3A and 3B of the present specification explicitly show devices having 20 or more discrete capture zones, and 68 or more discrete capture zones, respectively. Each of these drawings is referred to as partial schematic views of exemplary diagnostic elements, which are provided to contrast a linear versus parallel arrangement of the capture zones. *See, e.g.*, specification, "brief description of the figures" on page 3 and the text on page 31, lines 3-15. The skilled artisan would acknowledge that the diagnostic element depicted in each figure, and the number of discrete capture zones on the diagnostic element, is contemplated to extend beyond the exemplary partial view of each figure. Considering the teachings of the specification, the skilled artisan would readily acknowledge that nothing in the specification is intended to limit the number of capture zones contemplated by the present invention, and that the phrase "50 or more discrete capture zones" is inherently supported by the specification as filed.

In view of the express teachings of the specification, Applicant respectfully submits that the instant specification clearly conveys to the skilled artisan that Applicant was in possession of the invention as claimed at the time the instant application was filed. Furthermore, because the specification provides sufficient information to permit the skilled artisan to make and use the claimed invention without undue experimentation, Applicant requests that the enablement rejection be reconsidered and withdrawn.

35 U.S.C. § 112, second paragraph

Applicant respectfully traverses the rejection of claims 78 and 82 as allegedly being indefinite under 35 U.S.C. § 112, first paragraph, with regard to the phrase "time gate," and the term "nanoparticle."

When determining definiteness, the proper standard to be applied is "whether one skilled in the art would understand the bounds of the claim when read in the light of the specification." *Credle v. Bond*, 30 USPQ2d 1911, 1919 (Fed. Cir. 1994). Recognizing that the English language is not always precise, the settled law has established that the essential inquiry in a definiteness analysis is whether the claims set out and circumscribe the claimed subject matter with reasonable particularity. *See, e.g.*, MPEP § 2173.02; *see also, Miles Laboratories, Inc. v. Shandon, Inc.*, 27 USPQ2d 1123, 1127 (Fed. Cir. 1993) ("If the claims read in the light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more.") (emphasis added). Definiteness is not analyzed in a vacuum, but in light of the content of the specification, and with the knowledge available to the skilled artisan.

"time gate"(claim 78)

Applicant respectfully disagrees that the phrase "time gate" is indefinite, and may be considered to be "any absorbent structure capable of influencing fluid flow" as asserted in Paper No. 18, page 2. The specification describes in detail the meaning of the phrase "time gate" beginning on page 18, line 10 of the specification. In accordance with this description, the skilled artisan would understand that a time gate is an element in a device comprising a zone that is sufficiently hydrophobic so as to prevent passage of a predominantly aqueous fluid through or across the element until the zone is made sufficiently hydrophilic by binding of a component in the fluid to the zone. The specification continues to describe numerous methods by which such a time gate may be provided in a device. Applicant respectfully submits that, when read in light of the specification, the skilled artisan is reasonably apprised of the meaning of the phrase "time gate."

In an effort to advance prosecution, however, Applicant has amended claim 78 herein to recite that the time gate "delays fluid flow between a chamber and a diagnostic element until binding of a component from a fluid to a zone of said time gate renders said zone sufficiently

hydrophilic to permit fluid flow over or through said time gate." Support for this language may be found in the specification, *e.g.*, on page 18, lines 12-16 and 17-19.

This amendment is not further limiting of the claim, but rather simply makes explicit a definition of the phrase "time gate" that was already implicit in the claim. This amendment is not made for purposes of patentability, but rather for the benefit of the Examiner in understanding the claim. In view of the foregoing, Applicant respectfully requests that the definiteness rejection be reconsidered and withdrawn.

"nanoparticle" (claim 82)

Applicant respectfully disagrees that the term "nanoparticle" is indefinite, and may be considered to be simply "a small particle." The term "nanoparticle" is well known and commonly used in the art to refer to particles having dimensions between about 1 and 100 nm.

As evidence of this common understanding of the term, Applicant submits herewith several documents. First, Roco, *Int. J. Eng. Ed.*, Vol. 18 (2002) describes the dimensions commonly considered amongst artisans as being "nanoscale." *See, e.g.*, Roco, page 1 ("The essence of nanotechnology is the ability to work... in the length scale of about 1 to 100 nm"). The inclusion of nanoparticles in nanotechnology may be found on page 6, Table 3. This understanding of the meaning of the term "nanoparticle" is further confirmed in articles such as Grahl, "Exploring the Nanoparticle Potential" (*see, e.g.*, second paragraph, describing nanoparticulate materials as between 1 and 100 nm in size) and "Nanoparticle News" (*see, e.g.*, first paragraph, describing nanoscale particles as being sub-100 nm particles).

That the skilled artisan has long routinely understood and used this term, and particularly in biotechnology, is demonstrated by a search of the *PubMed* database. Focusing only on the years 1985-1992, 70 articles were identified using the term "nanoparticle" in the article title alone.

Given the common usage of the term "nanoparticle" by those of skill in the art, Applicant respectfully submits that claim 82 sets out and circumscribes the claimed subject matter with reasonable particularity. To the extent any latent ambiguity remains, Applicant expressly indicates that the term nanoparticle refers to particles having dimensions between about 1 and

100 nm. *See, e.g., Hormone Research Foundation, Inc. v. Genentech, Inc.*, 15 USPQ2d 1039 (Fed. Cir. 1990) (an applicant may be his or her own lexicographer, and may use terms even in a manner inconsistent with an ordinary meaning of the term, so long as that definition is made clear in the file history).

In view of the foregoing, Applicant respectfully requests that the definiteness rejection be reconsidered and withdrawn.

Art-Based Remarks

Obviousness-type double patenting

Applicant acknowledges the rejection of claims 74, 77, and 79-88 as allegedly being unpatentable over U.S. Patents 6,143,576; 6,156,270; 6,019,944; and 5,458,852. Should the claims be found otherwise allowable as presently written, a terminal disclaimer will be filed.

35 U.S.C. § 102

Applicant respectfully traverses the rejection of claims 74, 77-84, 86, 88, 89, 91-93, 95, and 97-100 under 35 U.S.C. §102(e), as allegedly being anticipated by Sun *et al.*, U.S. Patent 5,238,652 ("the '652 patent").

In order to anticipate a claim, a single prior art reference must provide each and every element set forth in the claim. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990). *See also*, MPEP §2131. The Examiner bears the initial burden of establishing a *prima facie* case of anticipation. Only once that *prima facie* case has been established does the burden shift to the applicant to rebut the *prima facie* case. *See, e.g., In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997).

The devices of the instant claims require, *inter alia*, the following elements (*see, e.g.*, claim 74):

1. a diagnostic element comprising a capillary space through which a sample flows,

2. a non-absorbent surface within the capillary space, and

3. a plurality of discrete capture zones on the nonabsorbent surface, each discrete capture zone comprising a capture element that binds one of a plurality of different target ligands.

The Examiner indicates a belief that "latex particles sensitized with antibodies" disclosed in the '652 patent "read on the claimed capture element." Paper No. 18, page 4. But the Examiner has not indicated any structure in the devices disclosed in the '652 patent that may correspond to a capillary space, or to a nonabsorbent surface within the capillary space that comprises a plurality of discrete capture zones. Applicant respectfully submits that this failure to address each and every limitation of the claims fails to meet the Examiner's initial burden of establishing a *prima facie* case of anticipation.

Moreover, the '652 patent does not disclose any devices having a nonabsorbent surface within a capillary space that comprises a plurality of discrete capture zones. Instead, the devices of the '652 patent use a "porous chromatographic membrane support... impregnated with a specific antigen or probe" as a means for binding analytes for detection. *See, e.g.*, '652 patent, column 4, lines 57-62; column 5, lines 1-6; and column 5, lines 21-37. Indeed, the instant invention is designed specifically to overcome problems inherent in precisely this use of a porous membrane within a device. *See, e.g.*, specification, page 5, lines 3-19. Applicant, therefore, respectfully submits that the '652 patent does not disclose every element of the instant claims.

Accordingly, because no *prima facie* case of anticipation has been established, Applicant respectfully requests that the rejection under 35 U.S.C. §102 be reconsidered and withdrawn.

35 U.S.C. § 103

Applicant respectfully traverses the rejection of claims 78, 85, 87, and 94 under 35 U.S.C. §103(a), as allegedly being obvious in view of Sun *et al.*, the '652 patent.

To establish a *prima facie* case of obviousness, three criteria must be met; there must be some motivation or suggestion, either in the cited publications or in knowledge available to one skilled in the art, to modify or combine the cited publications; there must be a reasonable expectation of success in combining the publications to achieve the claimed invention; and the

publications must teach or suggest all of the claim limitations. *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP § 2142. In analyzing obviousness, the Court of Appeals for the Federal Circuit has repeatedly cautioned that:

> [t]he factual inquiry... must be based upon objective evidence of record.... [T]he best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.... [P]articular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.

In re Sang-Su Lee, 277 F.3d 1338, 1343 (internal citations omitted).

As discussed above, the anticipation rejection fails to address each and every element of the instantly claimed invention. This flaw is repeated in the obviousness rejection, which states only that "Sun et al. is silent to covalent bonding, the claimed size range of 0.1-10 mm and use of a fluorescent label." Paper No. 18, page 5. As in the anticipation rejection, the failure to address each and every limitation of the claims fails to meet the Examiner's initial burden of establishing a *prima facie* case of obviousness.

Moreover, because the '652 patent does not disclose the claimed devices having a nonabsorbent surface within a capillary space that comprises a plurality of discrete capture zones, any *prima facie* case of obviousness must also provide some motivation for the skilled artisan to undertake suitable modification of the '652 devices in order to arrive at the instantly claimed invention. Because the Examiner fails to establish such a motivation, no *prima facie* case of obviousness has been established.

Additionally, with regard to dependent claims 78, 85, 87, and 94, the Examiner asserts without reference to any objective evidence of record that "[t]he selection of a covalent binding, the size range of the particle and the use of a fluorescent label are all result effective variables," and that therefore optimization of these variables is within the skill of the art. Paper No. 18, page 5. However, the recognition that a particular parameter is a result-effective variable must come from the prior art, and not from an unsupported assertion of the Examiner. *See, e.g.*, MPEP § 2144.05(II)(B). In contrast, nothing of record discloses the use of a time gate (claim 78),

immobilization of nanoparticles to a nonabsorbent surface through covalent bonds (claim 85), immobilization of particles having a diameter of 0.1mm to 10 mm to a surface through covalent bonds (claim 87), or generating a plurality of detectable signals using fluorescent labels (claim 94). Applicant respectfully requests that the Examiner provide objective evidence that such elements are result-effective variables, and of the various alleged "advantages" asserted by the Examiner, so that Applicant may have a fair opportunity for response to the rejection.

Furthermore, instant claim 85 refers to immobilization of nanoparticles to a nonabsorbent surface through covalent bonds. In contrast, the Examiner refers to "[c]ovalent binding of immunogens to a particle" (Paper No. 18, page 5), which is irrelevant to this claim. The assertion that it would have been obvious to select covalent bonds for the advantage of "being very strong" (Paper No. 18, page 5) is unsupported and in conflict with the teachings of the '652 patent that particles must be free to flow through the devices (*see, e.g.*, '652 patent, column 6, lines 49-58). The suggested modification renders the device disclosed in the '652 patent unsuitable for its intended purpose. A modification that renders the prior art unsatisfactory for its intended purpose cannot support a *prima facie* case of obviousness. MPEP § 2143.01.

Because the cited '652 patent, even if modified as suggested by the Examiner, fails to teach or suggest the instantly claimed devices, and because no motivation has been established for the modifications proposed by the Examiner, Applicant respectfully submits that no prima facie case of obviousness has been established. Applicant therefore requests that the rejection under 35 U.S.C. §103 be reconsidered and withdrawn.

CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the pending claims are in condition for allowance. An early notice to that effect is earnestly solicited. Should any matters remain outstanding, the Examiner is encouraged to contact the undersigned at the telephone number listed below so that they may be resolved without the need for an additional action.

Respectfully submitted,

Date June 23, 2003

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